

dispersion degree between particles. The Patent Office thus alleges that the copper alloy and second-phase elements contents, the solution heat treatment, working and aging steps recited in claims 1-6 are overlapped by Ikushima. Therefore, the Patent Office alleges that these recited properties would have been inherently possessed by the teachings of Ikushima. Applicants strenuously disagree with the allegations of the Patent Office.

As explained in the present specification, copper alloys containing titanium are known. From titanium-copper, a supersaturated solid solution is generated by solution treatment, and when it is subjected to aging from this state, a modulated structure which is in a metastable phase develops from the initiate state, and it stiffens remarkably at a certain time during its development stage. When the modulated structure is over-developed, the titanium-copper is in a so-called over-aged state, and finally,  $\text{TiCu}_3$  as a stable phase is precipitated. When the phase increases, the titanium-copper is conversely softened. In this series of aging processes, a modulated structure with high strength is a change which is generated from an unstable supersaturated solid solution, and the change is not generated from the  $\text{TiCu}_3$  phase, which is the stable phase toward the modulated structure (i.e., the metastable phase). See paragraph 4 of the specification. In addition, in one conventional technique, the additional elements (Ni, Al, Mg, Sn, Co, Cr, Zr, Fe, Zn, In, Mn, P, Si, V, Zr or B) are added to the titanium copper to bring about precipitation hardening due to the precipitation of the second-phase particle containing these components. See paragraph 5 of the specification. However, when securing sufficient addition amounts of elements for the precipitation hardening, there were problems in that formation of the modulated structure was prevented. See paragraph 5 of the specification.

According to the copper alloy recited in claims 1-6, the second-phase particles comprising Cu-Ti-X (X being the additional element, such as Fe, Co, Ni, Cr, V, Zr, B, and P) are precipitated. The Cu-Ti-X second-phase particles contribute to suppression of grain

growth after recrystallization. However, if the element is not precipitated as the second-phase particle, since the suppressing effect on grain growth is small, coarsening of the crystal grain occurs at the time of solution treatment, so that strength improvement is not expected. See paragraph 10 of the specification. In addition, when performing aging, if the additional elements are solved in the matrix, then disturbances occur in the formation of the modulated structure, so that the hardening degree decreases. See paragraph 10 of the specification. Therefore, the copper alloy recited in claim 1 includes the element, e.g., Fe, Co, Ni, Cr, V, Zr, B and P, in the second-phase particle in an amount where not less than 50% of the total content of the additional element exists as the second-phase particle. When the additional element is in the recited amount, it is possible to obtain simultaneously both excellent bendability and strength improvement at a high level. See paragraph 10 of the specification.

In contrast, the second-phase particles disclosed by Ikushima comprise  $\text{TiCu}_3$  (see column 2, lines 42-34 of Ikushima), which is different from the second-phase particle (Cu-Ti-X) recited in claims 1-6. As the second-phase particles taught by Ikushima do not contain the additional element as required in claims 1-6, Ikushima cannot obtain the above-mentioned advantages of the copper alloy recited in claims 1-6.

As explained above, the Patent Office further alleges that Ikushima inherently has the characteristics of the copper alloy recited in claims 1-6 because the copper alloy taught by Ikushima is produced by a process similar to the process disclosed in the present application. The Applicants strongly disagree with the Patent Office's allegations.

The special solution treatment necessary to produce the copper alloy is performed to obtain the second-phase particles recited in claims 1-6. In the solution treatment, the material must be heated up to a temperature at which titanium solubility becomes larger than the addition amount thereof, and the material must rapidly pass through the temperature range in which  $\text{TiCu}_3$  is easily precipitated, at least up to 600°C at a heating rate not less than

20°C/sec. According to this heating rate, it is possible to improve bendability while suppressing precipitation of  $\text{TiCu}_3$  which is stable phase, and it is possible to form the fine and homogenous second-phase particles in such a manner that the second-phase particles include the additional element.

In contrast, Ikushima does not teach or suggest the solution treatment in which the heating rate is not less than 20°C/sec at least up to 600°C. In Ikushima, fine and homogenous second-phase particles ( $\text{TiCu}_3$ ) are precipitated in a matrix by intermediate annealing performed at a low temperature that is lower than both the solid solution temperature and the recrystallization temperature, and thus  $\text{TiCu}_3$  is precipitated. See column 2, lines 35-39 and 47-59 of Ikushima. The solution treatment in Ikushima is performed at a temperature which is higher than both the solid solution temperature and the recrystallization temperature for a period of time ending immediately after or before the second-phase ( $\text{TiCu}_3$ ) is solved into the matrix. See column 3, lines 33-36 of Ikushima. Therefore, it is acceptable in the solution treatment according to Ikushima that  $\text{TiCu}_3$  remains in the matrix and the solution treatment is performed for recrystallization. Therefore, it is apparent that the solution treatment in the present application is not performed in Ikushima. Thus, the basis for the inherency allegation in the Office Action is incorrect. Nothing in Ikushima indicates that the characteristics of the copper alloy recited in claims 1-6 are inherently included in Ikushima.

Applicants submit that the second-phase particles taught by Ikushima differ from the second-phase particles recited in claims 1-6 as the second-phase particles taught by Ikushima do not include an additional element as required in claims 1-6. As such, the copper titanium alloy taught by Ikushima differs from the copper alloy recited in claims 1-6, and thus does not inherently include all of the characteristics of the copper alloy recited in claims 1-6.

For the foregoing reasons, Applicants submit that Ikushima does not teach or suggest all of the limitations recited in claims 1-6. Reconsideration and withdrawal of the rejection are respectfully requested.

**II. Rejoinder**

It is respectfully submitted that in accordance with MPEP §821.04, if product claims are elected and subsequently allowed, rejoinder of non-elected process claims which depend from allowed product claims will be permitted. Accordingly, Applicants submit that upon allowance of elected claims 1-6, non-elected claim 7 should be rejoined and similarly allowed as claim 7 is the method of producing the copper alloy recited in claims 1-6, and depends from claim 1.

Thus, withdrawal of the Restriction Requirement is respectfully requested.

**III. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-7 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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